Federal Aviation Administration

Memorandum

Date: May 26, 2011

To: Larry Kelly, Manager, Rotorcraft Standards Staff, ASW-110

From: Kim Smith, Manager, Rotorcraft Directorate, ASW-100

Prepared by: Clark Davenport, ASW-112

Subject: Equivalent Level of Safety (ELOS) Finding for Bell Helicopter Model 407 project SP4107RD-R

ELOS Memo No.: SP4107RD-R/F-1

Regulatory Ref: 14 CFR 27.1545(b)(2)

This memorandum documents an evaluation made by the Rotorcraft Directorate on the establishment of an equivalent level of safety finding (ELOS) for the Bell Model 407Glass Cockpit (407GX) helicopter.

Background

Bell Helicopter Textron Canada, Limited (BHTCL) has applied for a finding of equivalent level of safety for showing a red line at the power-off V_{NE} for the Bell 407 Cockpit Upgrade (Bell 407GX). The Bell 407 is certified under 14 CFR 27, Normal Category Rotorcraft. The Bell 407 GX is modified with an electronic flight instrument system (EFIS). This ELOS covers airspeed instrument markings required by 14 CFR 27.1541 and 14 CFR 27.1545.

The airspeed indicator is an electronic instrument and airspeed limits are continuously calculated by the air data system and displayed to the pilot, changing as the environmental and flight conditions change. The electronic airspeed indicator does not have a static power off V_{NE} marking indicated by a red, cross-hatched radial line as required by §27.1545(b)(2). Rather, the aircraft uses electronic air data computers (ADC) to calculate the current V_{NE} limit. Consequently, the display does not present a static power off V_{NE} indication. However, the system automatically senses dual engine failure conditions and reconfigures the airspeed display to show the all engine out (AEO) V_{NE} as a red radial with red shading for speeds higher than V_{NE}.

Applicable regulation(s)
14 CFR 27.1545(b)(2)

Regulation(s) requiring an ELOS finding

14 CFR 27.1545(b)(2)

Description of compensating features which provides an ELOS intended by the regulations

BHTC's implementation of their Vne marking scheme provides the intended function of showing only one Vne on the airspeed tape at a time. On the 407GX, the Vne marker is displayed as a red line, overlaid on the airspeed indicator tape and the marker varies in accordance with conditions. Normally V_{NE} is calculated as a function of temperature and pressure altitude. If autorotation occurs, the V_{NE} marker is automatically repositioned to the autorotation (power-off) Vne value of 100 KIAS. There is no other Vne marking on the airspeed tape. The use of the ADC to compute V_{NE} based on aircraft and environmental conditions provides the pilot with more accurate data than a statically defined V_{NE} marking.

Explanation of compensating features which provides an ELOS intended by the regulations

The FAA finds that the use of ADCs to calculate and present a power-off V_{NE} to the pilot as a red radial with red shading for airspeeds greater than V_{NE} value meets the intent of 14 CFR 27.1545(b)(2).

FAA approval and documentation of the ELOS

The FAA has approved the aforementioned ELOS finding in Project Issue Paper F-1. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Rotorcraft Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the Type Certificate Data Sheet under the Certification Basis section. An example of an appropriate statement is provided below.

Equivalent Level of Safety Findings have been made for the following regulation:

Title 14 CFR 27.1545(b)(2) (documented in ELOS Memo SP4107RD-R/F-1.

Kim Smith

Kim Smith, Rotorcraft Directorate
Aircraft Certification Service

6/15/11

Date